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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,209	06/03/2002	Malcolm Trayton Austen	722-X02-020	1825

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EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/069,209

Applicant(s)

AUSTEN ET AL.

Examiner

Kaj K. Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7,8,10-27 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31 is/are allowed.
- 6) ☒ Claim(s) 1-5,7,8,10-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 8, 11-13 and 18-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claims 8 and 11-13 were previously rejected over their use of the term “external connection”, which the examiner presumed was referring to “electrical contact” of claim 1. See paragraph 10 from the previous office action. In claim 8, applicant has not corrected the use of “external connection” nor has the applicant explained why the examiner was in error with his previous rejection. In claims 11-13 applicant changed “connection” to --contact--, but that only partially solves the original problem. Claim 1 referred to an “*electrical* contact” not an “*external* contact” (emphasis added) and claims 11-13 lack antecedent support for the term “external contact”.
3. Claims 12 and 13 were previously rejected because “electrodes” lacked antecedent basis. Claim 13 was additionally rejected because it was unclear how to interpret claim 13 in view of the requirement of claim 1 that the electrode be on the opposite surface to that of the electrical contact. See paragraphs 15 and 16 of the previous office action. Applicant has amended claims 12 and 13 to refer to a singular “electrode”. Although this would appear to resolve the previous antecedent issues, it raises new issues. First, claim 12 now does not appear to further limit claim 1 because claim 1 already required the electrode to be on an opposite surface from the electrical contact. Claim 12 merely reiterates what claim 1 already required, only now utilizes the term “first face”, which appear to be synonymous with “second surface” of claim 1. It is unclear what

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purpose claim 12 now serves. Second, if this new term “first face” is synonymous with the “second surface” of claim 1, why didn’t applicant use the term “second surface” rather than utilize a new and potentially confusing term? Similarly, applicant’s use of the term “second face” in claim 13 is also confusing.

4. In addition, applicant does not appear to have addressed the examiner’s concerns about how to interpret claim 13 in view of claim 1. Applicant urges that claim 13 is drawn to an embodiment where the electrical contact is on the same side of the membrane as the electrode. Indeed, the examiner recognizes that electrodes 136 and 138 of figure 3 have this feature. The problem is that it doesn’t appear that electrodes 136 and 138 would read on the electrode of claim 1. In particular, claim 1 requires that an electrical pathway be established via a conductive material between the electrical contact and the electrode that are on differing surfaces of the membrane. Electrodes 136 and 138 don’t appear to have this feature because they are not on differing surfaces of the membrane. Moreover, applicant never states that porous material 134 adjacent to electrodes 136 and 138 is ever impregnated with conductive material. The paragraph bridging pp. 12 and 13 only states that electrode 136 is impregnated with conductive material in order to establish an electrical pathway. This is in clear contrast to claim 1 that requires that conductive material be impregnated into *the gas porous membrane* for the establishment of the electrical pathway. In fact, impregnating porous material 134 with conductive material (which is never disclosed and would constitute new matter) would appear to be superfluous and unnecessary because the electrical contact and electrode are already on the same side of membrane. Impregnation of gas porous membrane would only serve a purpose when the electrode and the electrical contact are on opposite sides of the membrane (like the electrodes of

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fig. 1 and 2 and electrode 124 of fig. 3). However, none of these electrodes meets the requirement of claim 13 that the electrical contact and electrode be on the same face of the membrane. It would appear that claim 13 would be supported by the specification if the electrode and external (electrical?) contact of claim 13 were amended to refer to an *additional* electrode and external (electrical?) contact from the electrode and electrical contact of claim 1. If applicant were to make such an amendment, then the electrode of claim 1 would read on element 124 of fig. 3 while the electrode of claim 13 would then read on the additional electrode of 136 or 138.

5. Upon amendment, applicant incorporate limitations from claim 29 into claim 18. However, applicant did not appear to address the 112 issues concerning now cancelled claim 29 (see paragraphs 24 and 26 of the previous office action) and further exacerbated the indefiniteness by deleting the term "polymer" from claim 29 when incorporating it into claim 18. In particular, the examiner urged that "polymer electrolyte" should be --conductive polymer-- because applicant doesn't appear to have a polymer electrolyte. Electrolytes are materials that are *ionically* conductive while the polymers utilized by the applicant are materials that are *electrically* conductive (i.e. applicant is trying to establish an electrical pathway (see claim 18), not an ionic pathway). The materials utilized by the applicant do not appear to be electrolytes and applicant's use of the term would appear to be incorrect. Applicant has not explained why the examiner was incorrect in his earlier suggestion that the electrolytes of claims 24 and 29 (now claim 18) should be --conductive polymer-- and this rejection of claim 24 remains and claim 18 is now rejected for the reasons that claim 29 previously was.

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6. Furthermore, the amended claim 18 further confuses the issues. As the examiner alluded to in the earlier office action, when applicant stated “electrolyte” in claim 29, applicant appeared to be referring to the conductive material of claim 18 and not the “liquid electrolyte” of claim 18. Applicant’s amendment to claim 24 indicates that the applicant is in agreement with the examiner on that point. However, applicant’s amendment of claim 18 now conflates the “electrolyte” (i.e. the liquid electrolyte) of claim 18 with the previous “polymer electrolyte” of previous claim 29. These two terms were referring to different aspects of the gas sensor and these two terms should not be conflated. The purpose of the aperture was never to introduce liquid electrolyte (as claim 18 now reads), but rather to introduce the conductive material into the membrane (see p. 3, ll. 14-18 of the specification). Applicant should amend the last occurrence of “electrolyte” in claim 18 to --conductive material--.

7. Claim 18 still has the inconsistent use of “external connection” and “electrical contact”. See paragraph 18 from the previous office action. The “external connection” should be amended to --electrical contact--.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1-5, 7, 8, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthiessen in view of WO ‘826 or Cromer.

10. With respect to claim 1, Matthiessen discloses a method of manufacturing a gas sensor comprising the use of a ceramic disc 2. Said ceramic disc has a permeable region 50 as well as

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holes through the discs at various points (see reference numbers 14 in the figure). Hence the ceramic disc of Matthiessen would constitute a membrane giving the claim language its broadest reasonable interpretation. Matthiessen teaches having conductive material being impregnated in the holes of the membrane to define an electrical contact on a first surface of the membrane and an electrode (9, 12 or 13) on a second surface of the membrane. See the figure and col. 5, lines 11-26. Matthiessen further teaches arranging the membrane 2 in conjunction with housing 1 such that a reservoir 17 is sealed. See the figure and col. 5, lines 27-38.

11. Applicant has amended claim 1 to include the limitations of claim 6, which the examiner indicated in the previous office action was free of the prior art. However, applicant changed the previous “via” of claim 6 to the term “by” when incorporated it into claim 1. Although “by” can be interpreted as being synonymous with “via”, the term can also merely mean “in proximity to” (see definitions 1 and 2a for “by” at the end of this office action). Although Matthiessen did not explicitly disclose a wick in proximity to the membrane or conductive material, WO ‘826 teaches the presence of a wick material 54 in order to provide an electrode with better access to the electrolyte. See p. 21, lines 15-18. Cromer also discloses the presence of a wick in order to improve an electrodes access to the electrolyte. See abstract. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of either WO ‘826 or Cromer for the method or sensor of Matthiessen in order to provide an electrode with better access to electrolyte.

12. With respect to the sintering temperature, see WO ‘826 p. 8. lines 7-10. Furthermore, finding the suitable temperature for sintering a wick requires only routine skill in the art.

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13. With respect to claims 7 and 8, because the electrode and electrical contacts of Matthiessen are continuous with where the conductive material is to impregnate (see the figure), this would appear to meet these broad limitations.

14. With respect to claim 12, the electrodes are opposite the electrical connections. With respect to claim 13, it doesn't appear that this claim can be considered to further limit claim 1 since it appears to require structure in violation of the requirements of claim 1 (see 112 rejection above). Absent clarification as to how to interpret claim 13 as it depends from claim 1, this claim will be interpreted as being obvious over Matthiessen in view of WO '826 and Cromer.

15. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthiessen in view of either WO '826 or Cromer and in further view of Tomantschger.

16. With respect to claims 10, Matthiessen set forth all the limitations of the claims, but did not explicitly recite introducing the conductive material in melted form (claim 10).

Tomantschger teaches in an alternate gas sensor that the electrical connections can be established using a conductive polymer and the conductive polymer may be melted to establish a better electrical connection between the electrodes and the leads. See col. 4, lines 54-61 and col. 10, lines 26-32. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Tomantschger for the method of Matthiessen and either WO '826 or Cromer in order to establish a better electrical connection to the electrodes.

17. With respect to claim 11, Matthiessen in view of WO '826 or Cromer teach all the limitations of the claim, but did not explicitly recite forming the electrodes or connectors via any of the set forth methods. However, the use of spray coating and screen printing are notoriously

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old means for forming electrodes. In particular, this is demonstrated by Tomantschger. See col. 11, lines 43-49. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Tomantschger for the method of Matthiessen and either WO '826 or Cromer because the substitution of one known means for preparing electrodes for another known means requires only routine skill in the art.

18. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthiessen in view of WO '826 or Cromer and in further view of Dodgson.

19. Matthiessen in view of either WO '826 or Cromer set forth all the limitations of the claims, but did not explicitly recite the claimed means for bonding the housing and the membrane. Dodgson teaches in an alternate gas sensor that both are known means for sealing up a gas sensor. See col. 3, lines 57-65 and col. 5, lines 35-50. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Dodgson for the method of Matthiessen and either WO '826 or Cromer in order to ensure the sensor possesses a suitable seal for the electrolyte reservoir to prevent leakage.

20. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthiessen in view of WO '826 or Cromer and in further view of Tantram.

21. The references set forth all the limitations of the claim, but did not explicitly recite the step of decreasing the permeability of the membrane. However, the step of selectively reducing a membrane's permeability is well known in the art. In particular, Tantram teaches doing so in an alternate gas sensor in order to tailor its diffusion properties. See col. 4, lines 5-10. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to

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utilize the teaching of Tantram for the method of Matthiessen in view of either WO '826 or Cromer in order to precisely control the porosity of the membrane.

Response to Arguments

22. With respect to the 112 first paragraph rejections, the applicant's arguments were persuasive with respect to claim 7. Claim 9 has been cancelled and that rejection is thereby moot. With respect to 112 second paragraph rejection of claim 31, applicant's explanation of claim 31 is persuasive and the examiner has withdrawn that rejection. Applicant's other argument concerning the 112 paragraph rejections are either moot in view of the amendment or are not persuasive for the reasons given in the modified rejections above.

Allowable Subject Matter

23. Claim 31 is allowed.

24. Claims 18-27 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

25. Applicant's claims 1-5, 7, 8, 10-17 would be allowable if applicant changes the "by" of claim 1 to --via-- and overcomes the 35 U.S.C. 112, 2nd paragraph rejections for claims 8 and 11-13 set forth above.

Conclusion

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a long horizontal flourish extending to the right.

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May 12, 2005

**KAJ K. OLSEN
PRIMARY EXAMINER**